

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Fumio MORI

Divisional Appln. No.: 09/181,639
Filed: October 29, 1998

Group Art Unit: 2841
Examiner: Kamand CUNEO

Appl. No.: Not Assigned
Filed: February 25, 2002

Group Art Unit: Not Assigned

For: INTEGRATED CIRCUIT MOUNTING STRUCTURE AND ITS MOUNTING METHOD
THEREOF

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Amend the specification by inserting before the first line the sentence:

This is a divisional of Application No. 09/181,639 filed October 28, 1998; the disclosure of which is incorporated herein by reference.

On page 3, please replace the second full paragraph with the following new paragraph:

According to one aspect of the present invention, there is provided an integrated circuit mounting structure comprising: an integrated circuit; an electrode formed on an upper surface of the integrated circuit; a tape which is located at the periphery of said integrated circuit; a lead provided on said tape, one end of said lead is connected to said electrode; and a cut-out portion

formed at a portion of the lead adjacent to said electrode, the thickness of said cut-out portion is thinner than the thickness of a non-concave portion of the lead.

On page 5, please replace the 2nd full paragraph, with the following:

Referring to Fig. 2(A), the electrodes 3 on the integrated circuit 1 and the inner lead portion of leads 8 on TAB tape 7 are positioned, respectively. The leads 8 are formed by etching an electrolytic copper foil having a thickness of 35 micrometers. Otherwise, the leads 8 can be formed by the plating process such as an additive method. The surface of the lead 8 is plated with gold which thickness is 0.7 micrometer. It is preferable that the thickness of plated gold is equal to or less than 1.0 micrometer. Each lead 8 includes cut-out portion 80. The thickness of the cut-out portion 80 is thinner than that of the other portion of the lead 8. Further, the cut-out portion 80 is formed to a thickness at which the lead 8 is cut at the cut-out portion 80 when a tensile force is applied to the lead 8. The position of the cut-out portion 80 is set so that it is positioned at a position that is the same as or similar to the side of the integrated circuit 1 when the electrode 3 of the integrated circuit 1 is connected with the inner lead portion of the lead 8. In other words, the length from the tip of the lead 8 to the edge of the cut-out portion 80 is the same as or similar to a width of the electrode 3 and/or the connection pads 6. More specifically, the cut-out portion 80 is set to a position approximately 100 micrometers separated from the front end of the lead 8 and has a thickness of 15 micrometers. The cut-out portion 80 is previously formed through etching.

On page 5, please replace the 3rd paragraph continuing onto page 4, with the following:

In Fig. 2(B), the electrodes 3 of the integrated circuit 1 and the inner lead portions of the leads 8 on the TAB tape 7 are inner-lead-bonded by an Inner Lead Bonding (ILB) tool 9, respectively. In this embodiment, they are bonded by a constant heat system. More specifically, the leads 8 are pressed against the electrodes 3 by a constant heat tool to perform pressure heating for 3 seconds. Pressurization by the constant heat tool is 100 grams per lead and the heating temperature is set to 590 degrees centigrade. The actual measured temperature is approximately 550 degrees centigrade. In this case, the constant heat system is used; however, it is also possible to use a pulse heat system. The integrated circuit 1 mounted on the TAB tape 7 undergoes a functional inspection for confirming operations of the integrated circuit 1. Moreover, it is possible to apply a quality inspection, such as a burn-in test for finding initial defects, to the integrated circuit 1. The inspection is performed by using pads (not illustrated) and wiring (not illustrated) provided on the TAB tape 7.

On page 6, please replace the first full paragraph, with the following:

Referring to Fig. 2(C), the integrated circuit 1 is separated from the TAB tape 7. More specifically, the integrated circuit 1 is separated from the TAB tape 7 at the cut-out portion 80 by horizontally pulling the TAB tape 7. Thus, a piece of the lead 8, which is cut from the lead 8 at the point of the cut-out portion 80, is left on the electrode 3. The piece serves as bump 4.

On page 7, please replace the first full paragraph, with the following:

Next, a second embodiment of the present invention will be described in detail below.

The features of the second embodiment are that no cut-out portion is provided on a lead, and an integrated circuit 1 is separated from a TAB tape 7 by using means such as a cutter. Moreover, in the case of this embodiment, inner lead bonding is performed by an ultrasonic system and solder to be supplied to a mounting substrate uses Gold-tin (Au-Sn) solder.

IN THE CLAIMS:

Please cancel claims 1-6 without prejudice or disclaimer.

IN THE ABSTRACT:

Please delete the original Abstract and replace it with the following new Abstract:

--An integrated circuit mounting structure of this invention includes an integrated circuit; an electrode formed on an upper surface of the integrated circuit; and a tape which is located at the periphery of the integrated circuit. A lead is provided on the tape. One end of the lead is connected to the electrode. A cut-out portion is formed at a portion of the lead adjacent to the electrode. The thickness of the cut-out portion is thinner than the thickness of a non-concave portion of the lead.--

PRELIMINARY AMENDMENT
Divisional of U.S. Application No. 09/181,639

REMARKS

The changes made to the specification correspond to those made and entered in
parent application serial no. 09/181,639.

Entry and consideration of this Amendment is respectfully requested.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

On page 3, please replace the second full paragraph with the following new paragraph:

According to one aspect of the present invention, there is provided an integrated circuit mounting structure comprising: an integrated circuit; an electrode formed on an upper surface of the integrated circuit; a tape which is located at the periphery of said integrated circuit; a lead provided on said tape, one end of said lead is connected to said electrode; and a cut-out portion formed at a portion of the lead adjacent to said electrode, the thickness of said cut-out portion is thinner than the thickness of a non-concave portion of the lead.

On page 5, please correct the 2nd full paragraph, with the following corrections:

Referring to Fig. 2(A), the electrodes 3 on the integrated circuit 1 and the inner lead portion of leads 8 on TAB tape 7 are positioned, respectively. The leads 8 are formed by etching an electrolytic copper foil having a thickness of 35 micrometers. Otherwise, the leads 8 can be formed by the plating process such as an additive method. The surface of the lead 8 is plated with gold which thickness is 0.7 micrometer. It is preferable that the thickness of plated gold is equal to or less than 1.0 micrometer. Each lead 8 includes ~~concave~~ cut-out portion 80. The thickness of the cut-out ~~concave~~ portion 80 is thinner than that of the other portion of the lead 8. Further, the cut-out ~~concave~~ portion 80 is formed to a thickness at which the lead 8 is cut at the cut-out ~~concave~~ portion 80 when a tensile force is applied to the lead 8. The position of the cut-

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In Fig. 2(B), the electrodes 3 of the integrated circuit 1 and the inner lead portions of the leads 8 on the TAB tape 7 are inner-lead-bonded by an ~~ILB~~ Inner Lead Bonding (ILB) tool 9, respectively. In this embodiment, they are bonded by a constant heat system. More specifically, the leads 8 are pressed against the electrodes 3 by a constant heat tool to perform pressure heating for 3 seconds. Pressurization by the constant heat tool is 100 grams per lead and the heating temperature is set to 590 degrees centigrade. The actual measured temperature is approximately 550 degrees centigrade. In this case, the constant heat system is used; however, it is also possible to use a pulse heat system. The integrated circuit 1 mounted on the TAB tape 7 undergoes a functional inspection for confirming operations of the integrated circuit 1. Moreover, it is possible to apply a quality inspection, such as a burn-in test for finding initial

defects, to the integrated circuit 1. The inspection is performed by using pads (not illustrated) and wiring (not illustrated) provided on the TAB tape 7.

On page 6, please correct the first full paragraph, with the following corrections:

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IN THE ABSTRACT:

The original Abstract has been deleted and replaced with a new Abstract.